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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

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A search engine result matrix

Technical field

The present invention pertains to a search engine and a method for searching of information in an open network for data- and telecommunication. More specifically it utilizes existing meta tags and topic classification to present a search result in a matrix format in three dimensions.

Background art

A search engine is a program which returns a list of websites (URLs, Universal Resource Locators) that matches a search criteria. Some main search engines are Infoseek ®, Alta Vista ®, Yahoo ® etc.

A returned list from a search session in a search engine is built up hierarchically, for example, if a search results in a hundred hits a user can scroll the list from the first hit to the tenth. When having scrolled to the tenth hit the user is required to select the following ten hits and so on until the hundred-search hit has been read. This is very time consuming and most users stop after a few scrolls. It is thus a problem to get an overview of a search result when a hierarchic search list according to today search engines is presented. The search list is most frequently presented with the top ten most frequent sites according to a top-down percentage scale.

The US patent document 6,012,053 by Pant et al discloses a "Computer System with User-controlled Relevance Ranking of Search Results". This patent discloses how prior art search results are presented in a search engine, i.e., through a table, which consecutively lists each hit on a row in the table.

Hence there is a need for a fast presentation of all hits in a search list to get a glance of the total result of a search.

Summary of the disclosed invention

It is an aim of the present invention to provide a search list from a search in a search engine that is easy to overview, and whereby a user of the engine thus in one picture on a computer screen receives the opportunity to select a preferred URL address without having to scroll through several partitioned sub-lists.

In order to solve problems relating to existing search engine presentations the present invention sets forth a search engine for searching of information in an open network for data- and telecommunication. Thereby it comprises:

- a measuring means for a search result;

- a connection to a sorting means for sorting a search result into a matrix;

a matrix generating means; and
visualizing said matrix graphically on a screen connected to a computer running said engine,
whereby a measured search result is made visible to an engine user through said matrix as one
display on said screen.

5 In one embodiment of the invention one boarder of said matrix has a dateline axis
and one boarder has an information axis.

Another embodiment provides that a cell in said matrix is classified as a topic. A
further embodiment provides that said cell has an information code classification as an
addition.

10 According to a further embodiment a topic in a cell is stored in the computer when
selecting it.

A still further embodiment provides that a selection of a cell in said matrix results in
a sub-matrix, thus providing a matrix virtually in three-dimensions:

Yet another embodiment provides that a matrix cell is hyper linked to its related
15 information in the search engine. Still further, one embodiment of the invention provides that
a movement over a linked cell with a computer pointing device activates means for a pop up
summary based on an abstract field relating to said linked cell in the search engine.

Another embodiment provides that only the latest, in time, information element in a
cell of the matrix is presented. If there are further elements in time a hyper link to those other
20 elements is connected to a cell.

Yet a still further embodiment provides that an elaboration of a boarder axis of said
matrix results in a recalculation of a search result in accordance with the elaboration.

The present invention also sets forth a method used in a search engine for searching
of information in an open network for data- and telecommunication. It thus comprises the
25 steps of:

measuring a search result;

connecting to a sorting means for sorting a search result into a matrix;

generating the matrix; and

visualizing said matrix graphically on a screen connected to a computer running said engine,
30 whereby a search result is made visible to an engine user through said matrix as one display
on said screen.

The method provided is further presented in accordance with the embodiments of its
attached sub-claims accomplishing steps described for the above search engine.

Brief description of the drawings

Henceforth reference is had to the following description taken in conjunction with the attached drawings for a better understanding of the present invention with its examples and embodiments, whereby:

5 **Fig. 1** illustrates how topics and information codes are selected in accordance with one embodiment of the present invention;

Fig. 2 illustrates how topics are selected to be presented on one axis in a matrix and how information codes are selected on the remaining axis in accordance with one embodiment of the present invention;

10 **Fig. 3** illustrates a matrix display of a search result in accordance with one embodiment of the present invention;

Fig. 4 illustrates a flow chart for creating a matrix in accordance with one embodiment of the present invention;

15 **Fig. 5** illustrates another embodiment of the matrix in accordance with the present invention; and

Fig. 6 illustrates how a pop up list is displayed in accordance with one embodiment of the invention.

List of abbreviations

Deposit

20 Deposit is a process that a user has to go through to add information to a database.

Withdraw

Withdrawal is the process a user has to perform to extract data from a database.

Info element

25 An Information Element is a database record with all Classification Information and document attachments.

Topic Group

Topic Groups are used to guide Users to a desired Topic during Deposits and Withdrawals.

Topic

30 A Topic is the major level of classification available for an Info Element. All Info Elements belong to a least one Topic.

Sub Topic

A Sub Topic is the lowest level of classification available for an Info Element.

Information Code

Information Codes are META data about the Information Element and are very similar to Topics but are not used for building hierarchies in a database.

Information Code Group

Information Code Groups are used to guide users to a desired Information Code during

5 Deposits and Withdrawals.

META Data

Extended Information about Information added to a database. Together with the added information they become an Info Element.

META Tag

10 A META tag is a non-visible HTML tag used in the head area of a document to specify further information about the document. The META element is used within the Head element to embed document meta-information not defined by other HTML elements. Such information can be extracted by servers/clients for use in identifying, indexing, and cataloguing specialised document meta-information.

15 Preferred embodiments of the invention

In order to present advantages and aims of the present invention it is described in conjunction with a software tool named Comintell Knowledge XChanger™, which is a Comintell company proprietary software family for managing and visualizing business information and intelligence. Although the business approach is used as an example in
20 conjunction with the search engine according to the present invention, the invention is not limited to this. It is to be understood that other application areas are possible.

Knowledge XChanger is based on an SQL database (e.g. Oracle) with a web interface and an associated topic structure. Knowledge XChanger is a complete solution for storing, filtering, categorising, analysing, visualising and distributing information to
25 intelligent communities of so called knowledge workers.

Enterprises are producing more standardised reports and it should be possible to store/manage the parts of these reports as separate info-elements. This is accomplished by developing a database with a web interface. A purpose is to improve an output functionality so that users can visualize and cross-examine information found through a search engine more
30 efficiently.

Software modules that require logon are interfaced with Knowledge XChangerAccess Control Module. Data in a Knowledge XChanger database can be accessed

in three different ways:

1. Using topic browsing features
2. Using an ordinary search engine interface.
3. Using Matrix Search

5 The Matrix Search is providing a semi-graphical view of the Knowledge XChanger database.

There are three levels of Topics available in Knowledge XChanger:

1. Super level: a Topic Group containing a number of Topics.
2. Topic level: a Topic might contain a number of subtopics
- 10 3. Sub level: The lowest available level of Topics available for classification.

There are two levels of Info Codes available in Knowledge XChanger:

1. Super level: an InfoCode Group contains a number of InfoCodes
2. Infocodes are the lowest level of InfoCodes available for classification.

15 All information entered into Knowledge XChanger must be classified into one or more of the by an administrator defined Topic or Subtopics. The Topic Groups are used for managing the Topics. Classifying of information with InfoCodes is regarded as optional. But the Knowledge XChanger System treats topics and InfoCodes in a similar way. An example of how to classify an Information Element into Topics and InfoCodes is as follows:

20 Canada: Ericsson and 724 Solutions Showcase Future Wireless Banking Services Using 3G Technology At The 42nd GSM...

The above sample example regards the company Ericsson and an event that took place in Canada. In the sample case the Information is classified as:

25 **Topics**

Companies / Competitors / Ericsson

Countries / Canada

Infocodes:

Research & Development

30 Confirmed Fact

Topics and InfoCodes are totally dynamic, defined by an administrator of a search engine, who decides the meaning of them. Each installation of Knowledge XChanger will be unique in that respect. The infoCode "Research & Development" in the example above could be treated as a Topic in another installation of Knowledge XChanger.

It is possible to code a piece of information into several different Topics and InfoCodes. A user is required to enter at least one Topic in order to store a record in the database. The sample above would match the search criteria (withdraw) as being accomplished in the attached Fig. 1.

5 Fig. 1 illustrates how topics and information codes are selected in accordance with one embodiment of the present invention, where Ericsson is selected as a Topic. In the selection example of Fig. 1 a user is requested to select a main Topic and/or an Infocode.

The present invention sets forth a new inventive graphical representation herein named Matrix Visualizer which makes up a central function within the Knowledge XChanger
10 tool.

Fig. 2 illustrates how topics are selected to be presented on one axis in a matrix and how information codes are selected on the remaining axis in accordance with one embodiment of the present invention. In Fig. 2 the x-axis of the matrix to be visualized is chosen as a dateline/time line, here depicted as 30 days backwards from an existing day. The Infocode
15 chosen is all about the company Ericssons Topics. In the matrix, see Fig. 3, to be visualized Infocodes are represented on the y-axis.

It is one aim of the present invention that a user is able to select from menus, like those depicted in Fig. 1 and Fig. 2, a desired matrix view in three steps described below, according to how the selection has been entered, i.e.:

- 20 - by Topic (e.g. Competitor- Ericsson)
- by Information Code (e.g. Information Reliability, Information type etc.)
- by Date (e.g. all dates, date span, 1 week, 1 month, 3 months, 6 months back)

A database for information retrieval used by the search engine is then used to search and pull together and measure all information elements that fit the desired output and present
25 the result in a matrix.

Fig. 3 illustrates a matrix display of a measured search result in accordance with one embodiment of the present invention as depicted through the menus of Fig. 1 and Fig. 2.

Hence Fig. 3 displays one embodiment of a matrix in accordance with the present invention, whereby the user of the search engine is provided a semi-graphical representation
30 of the input, for example, with a dateline horizontally (x-axis) in columns and all information types input vertically (y-axis) in rows. The user might want all competitors (e.g. Topic Group Competitors) horizontally with Company Topics vertically. The user chooses what is displayed in the columns and what is displayed in the rows. There may thus potentially be several hundred cells in the matrix result screen.

The present invention thus sets forth a search engine for searching and measuring of information in an open network for data- and telecommunication. It has a connection to a measuring means and a sorting means for sorting a search result into a matrix. The matrix is generated and visualized graphically on a screen connected to a computer running the engine, whereby a measured search result is made visible to an engine user through said matrix as one display on said screen. It is also possible to prolong the matrix by using a bar in a window.

The user should be able to have an entire matrix just about one Topic (e.g. Ericsson or a country like the USA) and then choose horizontal (e.g. date) and vertical (e.g. company or country topics) options. This would in effect make the matrix 3-dimensional.

Each matrix cell will only contain the Title of the information, which is then hyper linked to the actual information in Knowledge XChanger. By moving a pointer device, for example, a mouse pointer over a link results in pop up summary, see Fig. 6 below, based on an abstract field in Knowledge XChanger.

Only the latest information element should be presented in each cell of the matrix, and if there are more information elements, there is a hyperlink, named More, to these. Following the More link results in a list of matching documents.

It is possible for a user to elaborate with the x and y-axis in the matrix result screen and recalculate the results, see the menu header recalculate in Fig. 3.

These given examples are to clarify a selection process and not necessarily used as a guide for graphical presentation. A hierarchical browser type of navigation is likely to be the preferred way of selecting Topics and infoCodes.

Fig. 4 illustrates a flow chart for the selection process for creating a matrix in accordance with one embodiment of the present invention.

Step one in the flowchart is to select an z-axis of the matrix, for example, an area a user wishes to analyze, whereby Topic Groups, Topics and InfoCodes are valid options in step one. Multiple selections can be accomplished to for example limit the matrix to two Topics [Ericsson AND Nokia] or a Topic and an InfoCode [Ericsson AND Confirmed Fact].

A second step according to the flow chart of the present invention is to select what is to be presented on the x- and y-axis in a generated matrix. Searched data is retrieved, Get data in Fig. 4, and the matrix is generated by a software means, Show matrix in Fig. 4. The result screen can be modified and recalculated, but is still using the preferences set in step one, Modify in Fig. 4.

Fig. 5 illustrates another embodiment of the matrix in accordance with the present invention. Here, cells in the generated matrix are visualized as small windows displaying measured search engine search hits for a chosen Topic.

Fig. 6 illustrates how a pop up list is displayed in accordance with one embodiment of the invention. By moving a pointer device, for example, a mouse pointer over a link it results in a pop up summary, see Fig. 6, based on an abstract field in Knowledge XChanger.

Knowledge XChanger is developed for the Windows @ NT platform, using MS-SQL 7.0 server as its database engine, and ColdFusion 4.5 as its application server to interact from web pages to a database. Version 4.0 of HTML has been used and Style sheets are included.

Knowledge XChanger also supports all UNIX dialects supported by ColdFusion and any ODBC connected SQL database such as, Oracle, Sybase etc.

A style sheet has been used throughout Knowledge XChanger. It is located in a style directory. A change in the style sheet, for instance color or font size, will change all the pages in Knowledge XChanger.

The present invention is not limited to the embodiments and examples given in the present description. It is the attached set of claims that defines the scope of the invention.

Claims:

1. A search engine for searching of information in an open network for data- and
5 telecommunication, comprising:
 - a measuring means for a search result;
 - a connection to a sorting means for sorting a search result into a matrix;
 - a matrix generating means; and
 - visualizing said matrix graphically on a screen connected to a computer running said
- 10 engine, whereby a measured search result is made visible to an engine user through said matrix as one display on said screen.
2. A search engine according to claim 1, wherein one boarder of said matrix has a dateline axis and one boarder has an information axis.
3. A search engine according to claims 1 or 2, wherein a cell in said matrix is
15 classified as a topic.
4. A search engine according to claim 3, wherein a cell has an information code classification as an addition.
5. A search engine according to claims 1-4, wherein a topic in a cell is stored when selecting it.
- 20 6. A search engine according to claims 1-5, wherein a selection of a cell in said matrix results in a sub-matrix, thus providing a matrix virtually in three-dimensions.
7. A search engine according to claim 5, wherein a matrix cell is hyper linked to its related information in the search engine.
8. A search engine according to claim 7, wherein a movement over a linked cell with
25 a computer pointing device activates means for a pop up summary based on an abstract field relating to said linked cell in the search engine.
9. A search engine according to claims 1-8, wherein only the latest information element in a cell of the matrix is presented.
10. A search engine according to claim 9, wherein a hyper link to other elements is
30 connected to a cell if there is more than one element in said cell.
11. A search engine according to claims 1-10, wherein an elaboration of a boarder axis of said matrix results in a recalculation of a search result in accordance with the elaboration.

12 A method for a search engine for searching of information in an open network for data- and telecommunication, comprising the steps of:

measuring a search result;

connecting to a sorting means for sorting a search result into a matrix;

5 generating a matrix; and

visualizing said matrix graphically on a screen connected to a computer running said engine, whereby a measured search result is made visible to an engine user through said matrix as one display on said screen.

10 13. A method according to claim 12, wherein one boarder of said matrix has a dateline axis and one boarder has an information axis.

14. A method according to claims 12 or 13, wherein a cell in said matrix is classified as a topic.

15. A method according to claim 14, wherein a cell has an information code classification as an addition.

15 16. A method according to claims 12-15, wherein a topic in a cell is stored when selecting it.

17. A method according to claims 12-16, wherein a selection of a cell in said matrix results in a sub-matrix, thus providing a matrix virtually in three-dimensions.

20 18. A method according to claim 16, wherein a matrix cell is hyper linked to its related information in the search engine.

19. A method according to claim 18, wherein a movement over a linked cell with a computer pointing device activates means for a pop up summary based on an abstract field relating to said linked cell in the search engine.

25 20. A method according to claims 12-19, wherein only the latest information element in a cell of the matrix is presented.

21. A method according to claim 20, wherein a hyper link to other elements is connected to a cell if there is more than one element in said cell.

22. A method according to claims 12-21, wherein an elaboration of a boarder axis of said matrix results in a recalculation of a search result in accordance with the elaboration.

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First dimension: Select the main *Topic* or and *Infocode* you would like to visualize (one choice only)

Topics

Competitors:

Countries:

Customers:

Suppliers:

-- None Selected --	⌵
-- None Selected --	⌵
Alcatel	
Ericsson	
Nokia	
-- None Selected --	⌵

Infocodes

Dateline

Company Topics:

Country Topics:

Information Reliability:

Security level:

Source Name:

Source type:

Strategic events:

Continue

-- None Selected --	⌵
-- None Selected --	⌵
-- None Selected --	⌵
-- None Selected --	⌵
-- None Selected --	⌵
-- None Selected --	⌵
-- None Selected --	⌵
-- None Selected --	⌵

Fig. 1

Second & Third dimension: Select the main *Topic* (x - axis) and *Infocode* (y - axis) you would like to visualize.

Topics (x-axis)

Dateline

Competitors:

Countries:

Customers:

Suppliers:

-- None Selected --	⌵
-- None Selected --	⌵
7 days back	
7 days forward	
30 days back	
30 days forward	
30 days back and forward	

Infocodes (y-axis)

Company Topics:

Country Topics:

Information Reliability:

Security level:

Source Name:

Source type:

Strategic events:

Matrix Visualize

All	⌵
-- None Selected --	⌵
-- None Selected --	⌵
-- None Selected --	⌵
-- None Selected --	⌵
-- None Selected --	⌵
-- None Selected --	⌵

Fig. 2

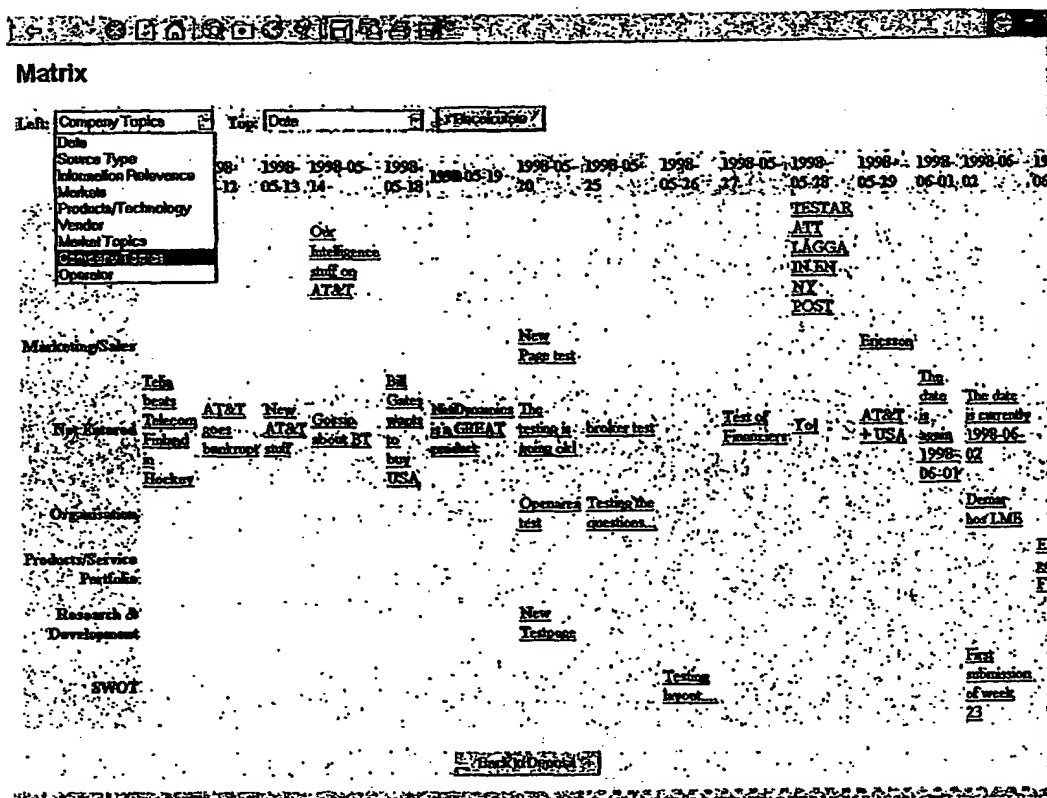
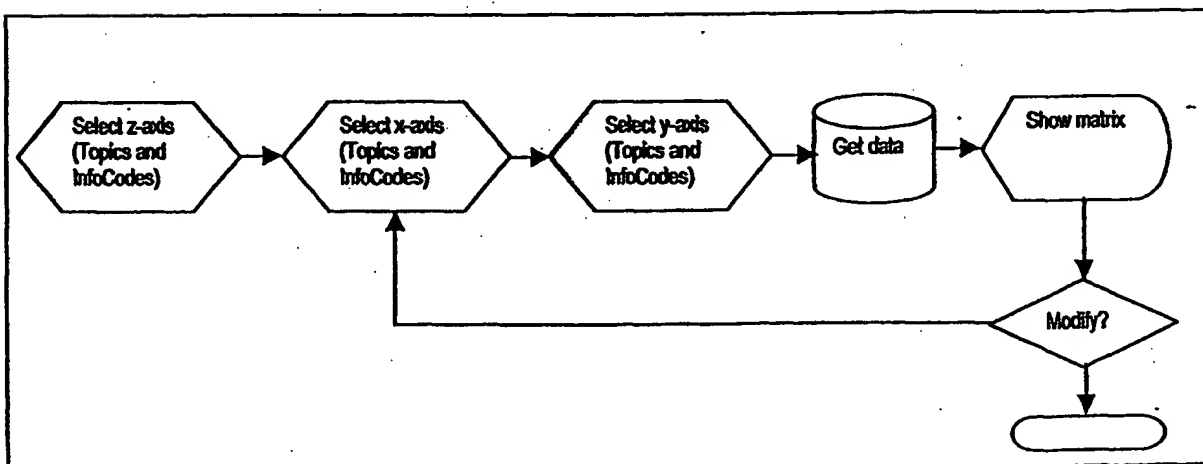


Fig. 3



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InSite

Comintell

Search

Left axis

Whole Group

Top axis

One Month back

Reseller

	2000-10-26	2000-10-25	2000-10-24	2000-10-23	2000-10-22	2000-10-21	2000-10-20	2000-10-19	2000-10-18	2000-10-17	2000-10-16	2000-10-15	2000-10-14	2000-10-13	2000-10-12	2000-10-11	2000-10-10	2000-10-09	2000-10-08	2000-10-07
Partners - Content	1 Hr	4 Hrs	4 Hrs	9 Hrs		1 Hr	6 Hrs	7 Hrs	4 Hrs	6 Hrs	24 Hrs			2 Hrs	4 Hrs	4 Hrs	4 Hrs	4 Hrs	4 Hrs	4 Hrs
Partners - Content/All / General																				
Partners - Content/Other																				
Partners - Content/ARsdata																				
Partners - Content/Esmerk																				
Partners - Content/IDC		3 Hrs	3 Hrs	5 Hrs			1 Hr	2 Hrs	1 Hr	3 Hrs	10 Hrs			2 Hrs		4 Hrs	3 Hrs	3 Hrs	3 Hrs	3 Hrs
Partners - Content/Standard & Poors																				
Partners - Content/Observer		1 Hr				1 Hr	2 Hrs		1 Hr	4 Hrs				2 Hrs						
Partners - Content/SRI Consulting																				
Partners - Content/Newsedge	1 Hr			1 Hr			1 Hr			1 Hr	2 Hrs									
Partners - Content/Factiva			1 Hr					5 Hrs	2 Hrs	1 Hr	1 Hr			2 Hrs						
Partners - Content/Yankee				3 Hrs			2 Hrs			1 Hr	2 Hrs								1 Hr	1 Hr
Partners - Content/Own																				
Partners - Software	7 Hrs	37 Hrs	21 Hrs	10 Hrs	1 Hr		15 Hrs	42 Hrs	15 Hrs	10 Hrs	37 Hrs	1 Hr	3 Hrs	5 Hrs	12 Hrs	44 Hrs	76 Hrs	76 Hrs	76 Hrs	76 Hrs
Partners - Software/All / General																				
Partners - Software/Other																				
Partners - Software/Intertec		2 Hrs					1 Hr	7 Hrs	3 Hrs	2 Hrs	3 Hrs		1 Hr	2 Hrs	7 Hrs	3 Hrs	3 Hrs	3 Hrs	3 Hrs	3 Hrs
Partners - Software/Autonomy	1 Hr	2 Hrs	5 Hrs		1 Hr		3 Hrs		2 Hrs	5 Hrs			1 Hr	1 Hr		8 Hrs	6 Hrs	6 Hrs	6 Hrs	6 Hrs
Partners - Software/Verity		2 Hrs	1 Hr					2 Hrs	1 Hr		2 Hrs				2 Hrs	4 Hrs	2 Hrs	2 Hrs	2 Hrs	2 Hrs
Partners - Software/Get Updated																				
Partners - Software/Excite																				

Fig. 5

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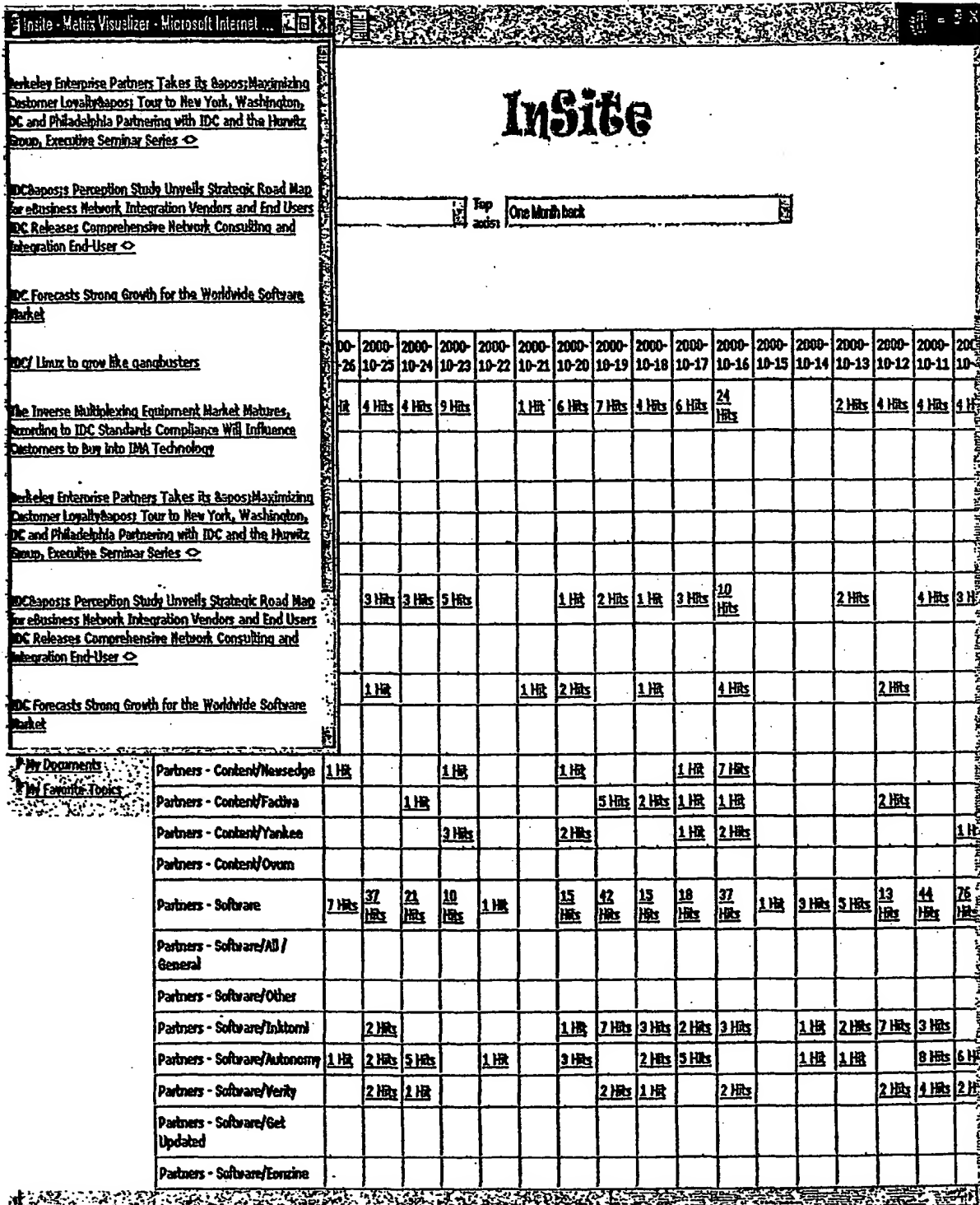


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/02597

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G06F 17/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5857179 A (VAITHYANATHAN, S. ET AL.), 5 January 1999 (05.01.99), column 2, line 20 - line 27; column 3, line 31 - line 43	1-22
X	US 6012053 A (PANT, S. ET AL.), 4 January 2000 (04.01.00)	1-22

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

- * Special categories of cited documents:
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- "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
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Date of the actual completion of the international search

6 March 2002

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INTERNATIONAL SEARCH REPORT
Information on patent family members

28/01/02

International application No.
PCT/SE 01/02597

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US	5857179 A	05/01/99	NONE	
US	6012053 A	04/01/00	NONE	

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